PART OF MIS-10216

MAINTENANCE ENGINEERING SECTION

Instruction Manual

MODEL 80E-10/AN

VOLTAGE DIVIDER

FLUKE

ELECTRONICS FOR INDUSTRY
INSTRUMENTS / COMPONENTS

MAINT ENG SECT

JOHN FLUKE MFG. CO., INC.

P.O. Box 7428 Seattle, Washington 98133

September 1, 1969

MODEL 80E-10/AN

VOLTAGE DIVIDER

80E-10/AN Serial no. and above.

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ADDENDA

FLUKE MODEL 80E-10/AN VOLTAGE DIVIDER

With the exception of information contained in this addenda, all of the operation and service data in the attached manual applies to the 80E-10/AN.

The 80E-10/AN is an intergral part of the Fluke Model 7180A Measurement System. In addition, the Model 80E-10/AN will operate from plus 4°C (39°F) to plus 40°C (104°F) with a relative humidity of 0 to 90% and at an altitude from 0 to 10,000 feet above sea level.

Amphenol AN-3057-16 5935-223-0574 70276 81352 88044 S4E .31 Q2200

ADDENDUM TO

5935-201-3103 02660

SECTION II OPERATING INSTRUCTIONS

HIGH VOLTAGE POWER SUPPLIES AND VOLTAGE DIVIDERS

1. Coaxial cables used to connect the instrument to a load are not provided by John Fluke Mfg. Co., Inc. Procurement of cables and the assembly of mating cable connectors must be carefully undertaken to insure safty of personnel.

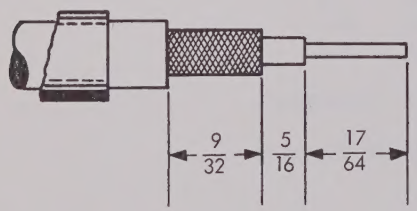
WARNING!

Extreme care should be exercised when utilizing high voltage conductors and connectors. Improper assembly of cable connectors or careless use of high voltage equipment may expose personnel to voltage of lethal magnitude.

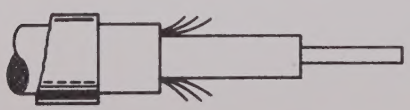
2. General instructions are provided herein for the assembly of two types of cable connectors issued as an accessory item with John Fluke instruments. Additional information on the assembly of these connectors, or on other types of connectors considered for use with the instrument, may be obtained from the cable or connector vending agency.

3. DAGE TYPE 486-1 CONNECTOR ASSEMBLY.

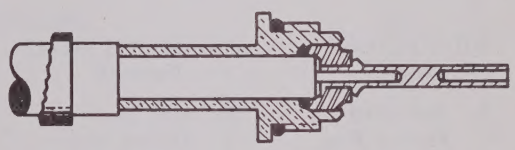
a. Cut cable off square on end. Slide outer sleeve over cable and slide back out of way. Trim cable to dim. shown being careful not to nick center conductor or braid. Tin dip center conductor. Remove all excess solder.



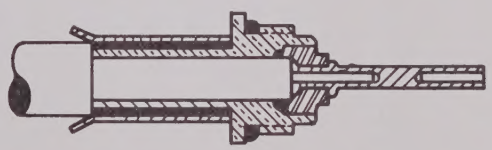
b. Rotate dielectric to slightly flare braid.



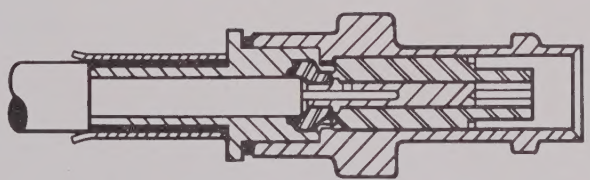
c. Push cable into nut sub-assembly until the center conductor is visible thru hole in contact. Soft solder center conductor thru hole in contact. Remove excess solder. Fold braid down over back end tube of nut. Trim excess braid if necessary.



d. Slide outer sleeves over braid until it is flush against back of nut. Crimp as close to nut as possible using proper crimping tool.



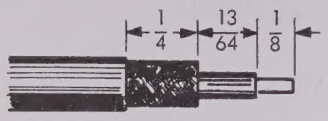
e. Insert finished cable assy. into body either jack or plug and tighten by rotating body. Do not rotate nut sub-assembly.



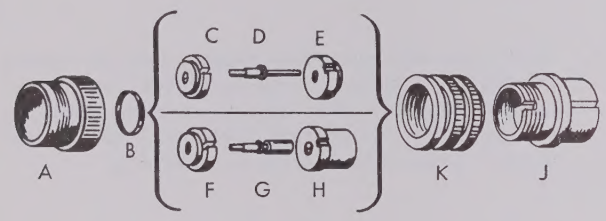
4. AMPHENOL MS 3106A CONNECTOR ASSEMBLY.

a. Strip cable jacket, braid, and dielectric to dimensions shown. All cuts are to be sharp and square. Do not nick braid, dielectric, and center conductor. Tinning of center conductor is not necessary if con-

tact is to be crimped. For solder method, tin center conductor avoiding excessive heat.



b. Disassemble connector by removing the back shell and retainer ring.

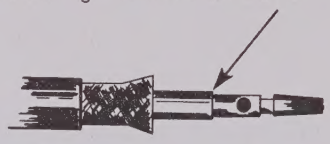


WITH PIN INSERT (Male)		WITH SOCKET INSERT (Female)	
A	Back Shell	A	Back Shell
B	Retainer Ring	B	Retainer Ring
C	Pin Rear Insert	F	Socket Rear Insert
D	Pin Contact	G	Socket Contact
E	Pin Front Insert	H	Socket Front Insert
J	Front Shell	J	Front Shell
K	Coupling Ring	K	Coupling Ring

c. Insert cable thru clamp MS 3057A and rear components of connector. Place the cable center conductor into the socket contact.

d. Soft solder contact to cable center conductor. Do not get any solder on outside surfaces of contact. Avoid excessive heat to prevent swelling or dielectric.

Contact must butt against cable dielectric



e. Provide a connection from the cable shield to the securing bolt of the cable clamp. The connecting copper wire should be approximately 5 inches long and size 14 or larger in diameter. A terminal lug should be used to connect the wire to the clamp. The wire should be carefully soldered to the shield, taking care not to damage the insulation of the cable. Loose ends of the shield should be clipped off to prevent shorting the center conductor or contact to the shield.

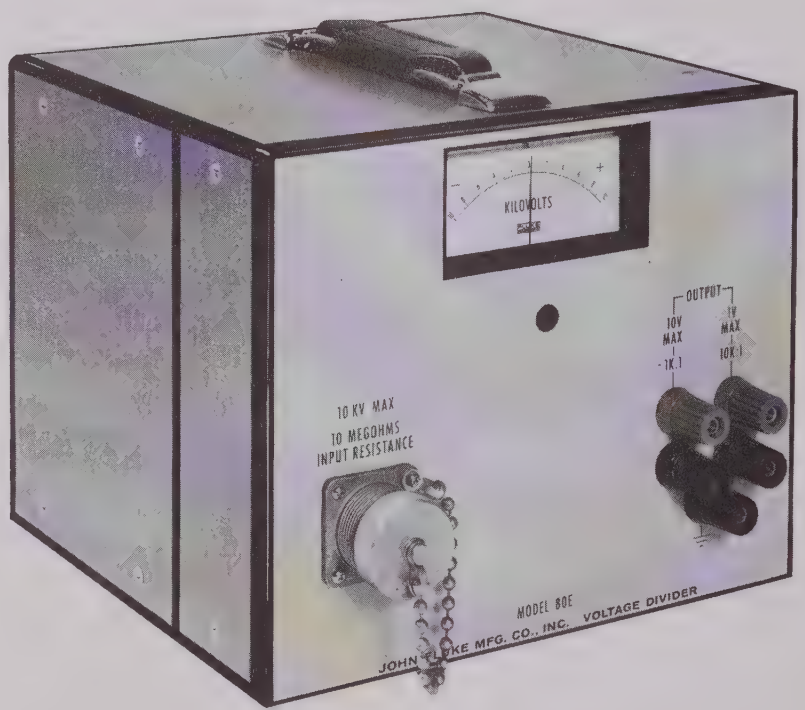
f. Assemble the cable connector by placing the contact into the socket front insert, then coupling the back shell to the front shell in the reverse of the disassembly procedure.

TABLE OF CONTENTS

Section	Title	Page
I	INTRODUCTION AND SPECIFICATIONS	1-1
	1-1. Introduction	1-1
	1-5. Specifications	1-1
	1-6. Electrical	1-1
	1-7. Mechanical	
II	OPERATING INSTRUCTIONS	2-1
	2-1. Operating Procedure	2-1
III	THEORY OF OPERATION	3-1
	3-1. Theory of Operation	3-1
IV	MAINTENANCE	4-1
	4-1. Introduction	4-1
	4-2. Troubleshooting	4-1
	4-5. Calibration of 80E-10	4-1
	4-7. Calibration of 80E-5	4-2
V	LIST OF REPLACEABLE PARTS	5-1
	5-1. Introduction	5-1
	5-2. How to Obtain Parts	5-1
	5-3. Use Code Effectivity	5-5
	WARRANTY	
	CIRCUIT DIAGRAM	

LIST OF ILLUSTRATIONS

Figure	Title	Page
Frontispiece	80E Voltage Divider.	iv
4-1.	Equipment Required for Calibration	4-1
5-1.	Final Assembly.	5-1
5-2.	Calibration Assembly	5-3
5-3.	Divider Assembly.	5-4



MODEL 80E VOLTAGE DIVIDER

SECTION I

INTRODUCTION AND SPECIFICATIONS

1-1. INTRODUCTION

1-2. The Model 80E Voltage Dividers extend the measuring range of Fluke differential voltmeters. The Model 80E-10 has a maximum input voltage of 10KV. The Model 80E-5 has a maximum input voltage of 5KV. Other input voltages are available on request. Both 10V and 1V output terminals are provided, which permit use of the 80E with Fluke differential voltmeters, or a null-type potentiometer.

1-3. A center zero panel meter permits observation of the approximate magnitude and polarity of the unknown voltage. In order to ensure maximum accuracy and long life, properly aged, wirewound resistors, having a very low temperature coefficient, are used throughout the instrument. The case of the instrument is suitable for either bench use or rack mounting.

1-4. This instrument has been thoroughly checked and tested before being shipped from the factory. Immediately after receiving the instrument, carefully inspect for any damage which may have occurred during transit. If any damage is noted, refer to the instructions outlined in the back of this manual.

1-5. SPECIFICATIONS

1-6. ELECTRICAL

ACCURACY: ±0.01% for both division ratios over a temperature range from 18° C to 28° C and for any input voltage up to rated maximum. Derate at 2 ppm/° C outside this temperature range to 0° C and 50° C.

STABILITY OF DIVISION RATIO: ±0.01% per year (recalibrated by internal adjustment).

METER: Center zero panel meter for indicating approximate magnitude and polarity of unknown high voltage.

1-7. MECHANICAL

INPUT CONNECTOR: MS3102A-18-16S on front panel (mating connector supplied).

OUTPUT CONNECTORS: Two binding posts on 3/4" centers for each of two outputs. One side of each output is common to chassis. Separate binding post for grounding case. All output connectors located on front of instrument.

TEMPERATURE RANGE:
0° C to 50° C (32° F to 122° F) operating
-35° C to 70° C (-31° F to 158° F) storage

HUMIDITY:
0 to 80% (to 28° C)
0 to 60% (to 50° C)

ALTITUDE:
0 to 10,000 feet operating
0 to 50,000 feet non-operating

VIBRATION:
MIL-T-945A.

SHOCK: Meets half sine (20g's, 11 milliseconds) shock and bench handling requirements of MIL-E-4970A.

SIZE:
7" high x 8-1/2" wide x 8" deep.

WEIGHT: Approximately 6 pounds.

Model	Division Ratio		Maximum Input	Current Drawn at Maximum Input	Total Input Resistance
	10V Max	1V Max			
80E-5	500:1	5,000:1	5 KV	1 ma	5 Meg
80E-10	1000:1	10,000:1	10 KV	1 ma	10 Meg

SECTION II

OPERATING INSTRUCTIONS

2-1. OPERATING PROCEDURE

a. Connect the ground side of the voltage to be measured to the ground terminal on the front panel. Please note that the shell of the large input connector is also connected to chassis ground.

b. Connect the voltage to be measured to the large input connector.

c. Connect a Fluke 800 series differential voltmeter to either set of output terminals. Voltages marked by the OUTPUT terminals (10V and 1V) refer to the output voltage at maximum indicated input.

d. Null the voltmeter to indicate the magnitude of the unknown voltage.

e. If desired, instead of using the Fluke voltmeter in step c, a Leeds & Northrup Type K-3 Potentiometer may be connected to the 1V OUTPUT terminal, and adjusted to indicate the unknown voltage.

SECTION III

THEORY OF OPERATION

3-1. THEORY OF OPERATION

3-2. The 80E is a standard type of potentiometric voltage divider. Specified accuracy of the division ratio is obtained only when the instrument connected to the output terminals of the 80E has infinite input impedance. A voltmeter having 10 megohms input resistance will "load" the 10V output of the divider, causing an error of approximately 0.1%. Fluke differential voltmeters present infinite input impedance to the voltage divider at null, and consequently, cause no loading error.

3-3. Resistors used in the 80E are precision wirewound units having a low temperature coefficient, which promotes instrument accuracy and stability.

3-4. The overall accuracy of the panel meter, including the effects of series resistance, is approximately 3% of full scale. The meter is useful for indicating the approximate magnitude and polarity of the unknown voltage.

SECTION IV

MAINTENANCE

4-1. INTRODUCTION

4-2. The Model 80E Voltage Divider requires a minimum of maintenance. Occasionally, dust should be removed from the instrument by clean, dry, pressurized air. The front panel connectors may be cleaned using anhydrous alcohol. If the circuit boards require cleaning, they can also be cleaned with anhydrous alcohol.

4-2. TROUBLESHOOTING

4-3. The following two items are the only usual sources of trouble in the 80E:

a. Instability of the output voltage, which is usually caused by a short in one or more resistors.

b. Output voltage out-of-tolerance, which is usually caused by:

(1) Dirty output connectors.
(2) Dusty printed circuit boards.
(3) A change in value of a resistor.

4-4. The remedy, as suggested by the preceeding paragraph, is to clean the dusty or dirty surface, and/or replace the defective resistor.

4-5. CALIBRATION OF 80E-10

4-6. The division ratio accuracy of the 80E should be checked approximately every six months. The equipment required for calibration is listed in Figure 4-1.

NOTE

Full input voltage should be applied to the 80E for a minimum of 30 minutes prior to calibration.

a. CALIBRATION OF IV OUTPUT

(1) Connect the positive output terminal of the 301E to the 30V terminal of the 9700A and to the 10V OUTPUT terminal of the 80E. The connecting leads must be equal in length.

(2) Connect the 840A galvanometer between the 3V terminal of the 9700A and the 1V OUTPUT terminal of the 80E. Set the 840A to the 300-0-300 nanoampere range.

(3) Set the output of the 301E to 10V.

(4) Adjust R3, located on the calibration board, to null the 840A. As null is approached, the 840A may be set to a more sensitive range.

b. METER CALIBRATION

(1) Disconnect the Model 301E, and connect the positive output of a Fluke Model 410A to the large input connector of the 80E.

(2) Set the 410A for 10KV output.

(3) Adjust R4 for full-scale deflection of the panel meter.

c. CALIBRATION OF 10V OUTPUT

(1) Connect the positive output of the 410A to the 1500V terminal of the 9700A and to the 80E input connector. The connecting leads must be equal in length.

EQUIPMENT	SPECIFICATIONS
DC Power Supplies, Fluke Models 301E and 410A or equivalent.	Must provide stable outputs of 10V, and up to 10KV, respectively.
Galvanometer, Fluke Model 840A.	Null Detector. Sensitivities of 2 na per division and 20 na per division.
Volt Box, Sensitive Research, Type 9700A or equivalent.	Division ratios of 1,000 to 1 and 10,000 to 1. (500 to 1 and 5,000 to 1 for the 80E-5).

Figure 4-1. EQUIPMENT REQUIRED FOR CALIBRATION

(2) Connect the 840A between the 1.5V terminal of the 9700A and the 10V OUTPUT terminal of the 80E. Set the 840A to the 3-0-3 microampere range.

(3) Set the 410A for 750V output.

(4) Adjust R5, and then R6, to null the 840A. As null is approached, the 840A may be set to more sensitive ranges. If R5 and R6 do not provide sufficient resistance, the jumpers across R7, R8, and/or R9 can be removed.

4-7. CALIBRATION OF 80E-5

NOTE

Full input voltage should be applied to the 80E for a minimum of 30 minutes prior to calibration.

a. CALIBRATION OF IV OUTPUT

(1) Perform the steps indicated in paragraph 4-6a.

b. METER CALIBRATION

(1) Disconnect the Model 301E, and connect the positive output of a Fluke Model 410A to the large input connector of the 80E.

(2) Set the 410A for 5KV output.

(3) Adjust R4 for full-scale deflection of the panel meter.

c. CALIBRATION OF 10V OUTPUT

(1) Connect the positive 410A output terminal to the 1500V terminal of the 9700A and to the input terminal of the 80E-5. The connecting leads must be equal in length.

(2) Connect the 840A between the 3V terminal of the 9700A and the 10V OUTPUT terminal of the 80E. Set the 840A to the 3-0-3 microampere range.

(3) Set the 410A for 750V output.

(4) Adjust R5, and then R6, to null the 840A. As null is approached, the 840A may be set to more sensitive ranges. If R5 and R6 do not provide sufficient resistance, the jumpers across R7, R8, and/or R9 can be removed.

SECTION V

LIST OF REPLACEABLE PARTS

5-1. INTRODUCTION

The following list describes all normally replaceable parts of the Model 80E Voltage Divider. Parts are identified on the list by reference designations from the schematic diagram.

5-2. HOW TO OBTAIN PARTS

a. Most parts are standard components and can be obtained locally. All parts manufactured, altered, or designed by Fluke are designated by an asterisk preceding the Fluke part number. All structural parts and all special parts should be ordered from your local Fluke representative or from the factory.

b. When ordering parts always include:

(1) Reference designation, description, and Fluke stock number.

(2) Instrument model and serial number.

c. Most structural parts are not listed in the following chart. To order these, give complete description, function and location of part.

REF DESIG	DESCRIPTION	STOCK NO	MFR	MFR PART NO	TOT QTY	REC QTY	USE CODE
	Final Assembly - Figure 5-1						
	Calibration Assembly - Figure 5-2	1702-167163	89536	1702-167163	1		
R1	Res, ww, 1k, ±0.01%, 1/2w	4707-166579	89536	4707-166579	1		A
R2	Res, ww, 8.998k ±0.01%, 1/2w	4707-166587	89536	4707-166587	1		A
R1, R2	Resistor set, matched	4710-233072	89536	4710-233072	1		B
R3	Res, var, ww, 5Ω ±20%, 1-1/4w	4702-166348	71450	Type 110	1		
R4	Res, var, ww, 200Ω ±20%, 1-1/4w	4702-144766	71450	Type 110	1		
R5	Res, var, ww, 10k ±10%, 1/4w	4702-111641	80294	275-1-103	1		
R6	Res, var, ww, 100Ω ±20%, 1-1/4w	4702-112797	71450	Type 110	1		
R7, R8, R9	Res, ww, 8k ± 0.02%, 1w	4707-131946	89536	4707-131946	3		
R10	Res, ww, 482k ±0.1%, 1w	4707-166595	89536	4707-166595	1		

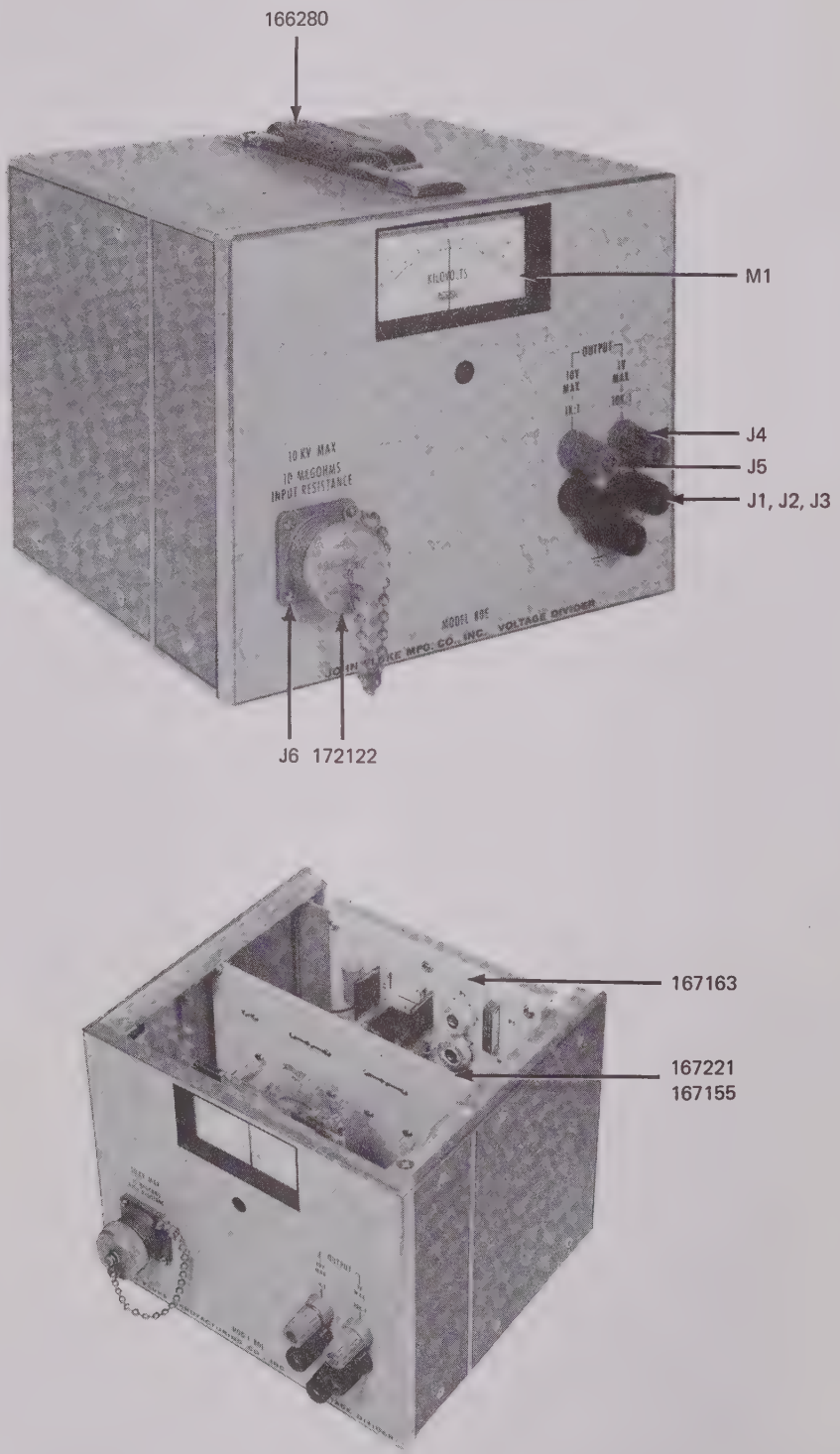


Figure 5-1. FINAL ASSEMBLY

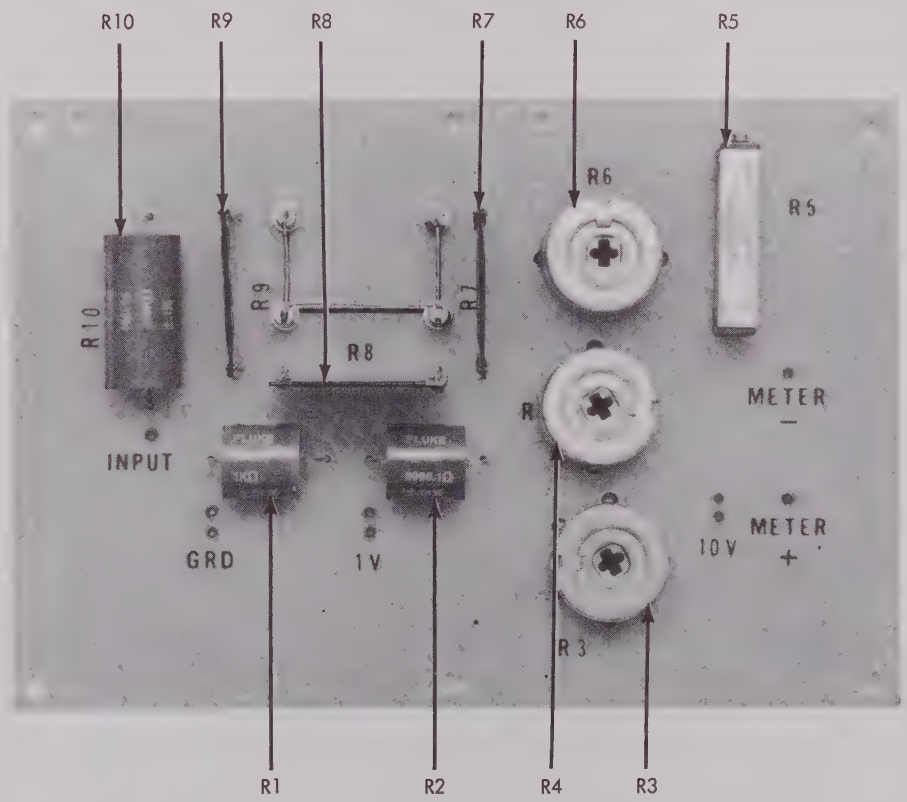


Figure 5-2. CALIBRATION ASSEMBLY

REF DESIG	DESCRIPTION	STOCK NO	MFR	MFR PART NO	TOT QTY	REC QTY	USE CODE
	Driver Assembly - Figure 5-3						
	80E-5 only	1702-167221	89536	1702-167221	1		
	80E-10 only	1702-167155	89536	1702-167155	1		
R11 thru R19	Res, ww, 500k ±0.1%, 1w (80E-5 only) (R11/R12, R13/R14, R15/R16, R17/R18 must be replaced in pairs.) (R11 thru R19 may be ordered as a set, part number 4710-223685.)	4707-192773	89536	4707-192773	9		
R11 thru R29	Res, ww, 500k ±0.1%, 1w (80E-10 only) (R11/R12, R13/R14, R15/R16, etc. must be replaced in pairs.) (R11 thru R29 may be ordered as a set, part number 4710-223701.)	4707-192773	89536	4707-192773	19		
J1, J2 J3	Binding post, black	2811-142984	58474	DF31BC	3		
J4, J5	Binding post, red	2811-142976	58474	DF31RC	2		
J6	Connector, high voltage	2104-208819	02660	MS3102A-18-16P	1		
M1	Meter, 1-0-1 ma	2901-167262	89536	2901-167262	1		
	Connector cap	3155-172122	89536	3155-172122	1		
	Mating connector (not illustrated)	2104-208827	02660	NS3106A-18-16S	1		
	Rubber supports	2819-103309	77969	9102-W	4		
	Handle, 4 inch	2404-166280	12136	919-415-173	1		
	Cable clamp (AN3057-10)	2104-100149	02660	AN3057-10	1		

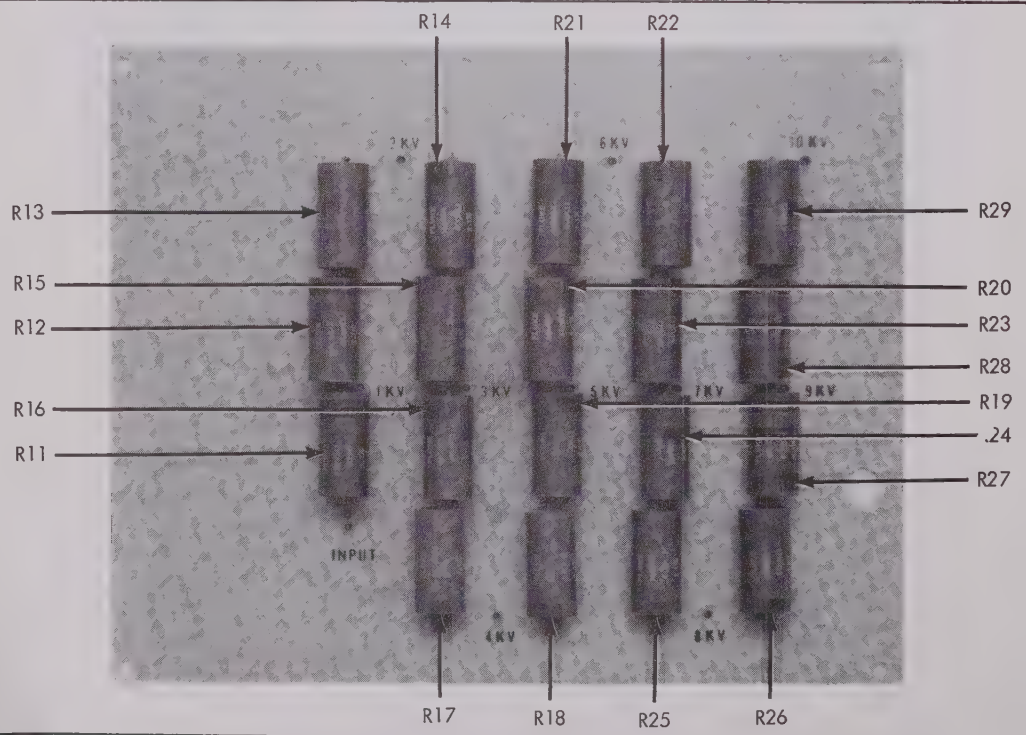


Figure 5-3. DIVIDER ASSEMBLY

5-3. USE CODE EFFECTIVITY

The following list of use codes is intended to allow the customer to determine the effectivity of all replaceable parts. All parts with no code are used on all instruments with serial numbers above 123. New codes will be added as necessary.

USE CODE	EFFECTIVITY
No Code	Model 80E serial number 123 and on
A	Model 80E serial number 123 to 459
B	Model 80E serial number 460 and on

APPENDIX A

FEDERAL SUPPLY CODE FOR MANUFACTURERS

A-1. CODE TO NAME

A-2. The following five-digit code numbers are listed in numerical sequence along with the manufacturer's name and address to which the code has been assigned. The Federal Supply Code has been taken from Cataloging Handbook H 4-2, Code to Name.

00213	Sage Electronics Corp. Rochester, New York
00327	Welwyn International, Inc. Westlake, Ohio
00656	Aerovox Corp. New Bedford, Massachusetts
00779	AMP Inc. Harrisberg, Pennsylvania
01121	Allen-Bradley Co. Milwaukee, Wisconsin
01281	TRW Semiconductors Lawndale, California
01295	Texas Instruments, Inc. Semiconductor Components Div. Dallas, Texas
01686	RCL Electronics Inc. Manchester, New Hampshire
01730	Deleted
01884	Dearborn Electronics Inc. Orlando, Florida
02114	Ferroxcube Corp. Saugerties, New York
02606	Replaced by 15801
02660	Amphenol-Borg Elect. Corp. Broadview, Illinois
02799	Arco Capacitors, Inc. Los Angeles, California
03614	Replaced by 71400
03651	Replaced by 44655
03797	Eldema Corp. Compton, California
03877	Transitron Electronic Corp. Wakefield, Massachusetts
03888	Pyrofilm Resistor Co., Inc. Cedar Knolls, New Jersey
03911	Clairex Corp. New York, New York
03980	Muirhead Instruments, Inc. Mountainside, New Jersey
04009	Arrow Hart and Hegemen Electronic Company Hartford, Connecticut
04062	Replaced by 72136
04202	Replaced by 81312
04217	Essex Wire Corp. Wire & Cable Div. Anaheim, California
04221	Aemco Div. of Midtex Inc. Mankato, Minnesota
04645	Replaced by 75376
04713	Motorola Semiconductor Products Inc. Phoenix, Arizona
05082	Replaced by 94154
05236	Jonathan Mfg. Co. Fullerton, California
05277	Westinghouse Electric Corp. Semiconductor Dept. Youngwood, Pennsylvania
05278	Replaced by 43543
05397	Union Carbide Corp. Electronics Div. Cleveland, Ohio
05571	Sprague Electric Co Pacific Div. Los Angeles, California
05704	Alac, Inc. Glendale, California
05820	Wakefield Engineering Ind. Wakefield, Massachusetts
06001	General Electric Company Capacitor Department Irmo, South Carolina
06136	Replaced by 63743
06473	Amphenol Space & Missile Sys. Chatsworth, California
06555	Beede Electrical Instrument Co. Penacook, New Hampshire
06739	Electron Corp. Littletown, Colorado
06743	Clevite Corp. Cleveland, Ohio
06751	Semcor Div. Components Phoenix, Arizona
06860	Gould National Batteries Inc. City of Industry, California
06980	Eitel-McCullough, Inc. San Carlos, California
07115	Replaced by 14674
07138	Westinghouse Electric Corp. Electronic Tube Div. Elmira, New York
07263	Fairchild Semiconductor Div. of Fairchild Camera & Instrument Corp. Mountain View, California
07344	Bircher Co., Inc. Rochester, New York
07792	Lerma Engineering Corp. Northampton, Massachusetts
07910	Continental Device Corp. Hawthorne, California
08530	Reliance Mica Corp. Brooklyn, New York
08792	CBS Electronics Semiconductor Operations-Div. of CBS Inc. Lowell, Massachusetts
08806	General Electric Co. Miniature Lamp Dept. Cleveland, Ohio
08863	Nylomatic Corp. Norrisville, Pennsylvania
08988	Skottie Electronics Inc. Archbald, Pennsylvania
09922	Burndy Corp. Norwalk, Connecticut
11237	Chicago Telephone of Calif. Inc. South Pasadena, California
11358	CBS Electronics Div. of CBS Inc. Newburyport, Massachusetts
11403	Best Products Co. Chicago, Illinois
11503	Keystone Mfg Div. of Avis Industrial Corp. Warren, Michigan
12014	Chicago Rivet & Machine Co. Bellwood, Illinois
12040	National Semiconductor Corp. Danburry, Connecticut
12060	Diodes, Inc. Chatsworth, California
12136	Philadelphia Handle Co. Camden, New Jersey
12323	Presin Co., Inc. Shelton, Connecticut
12327	Freeway Washer & Stamping Co. Cleveland, Ohio
12400	Replaced by 75042
12617	Hamlin Inc. Lake Mills, Wisconsin
12697	Clarostat Mfg. Co. Dover, New Hampshire
12749	James Electronics Chicago, Illinois

12856 Micrometals
Sierra Madre, California

12954 Dickson Electronics Corp.
Scottsdale, Arizona

13606 Sprague Electric Co.
Transistor Div.
Concord, New Hampshire

13839 Replaced by 23732

14099 Semtech Corp.
Newbury Park, California

14193 California Resistor Corp.
Santa Monica, California

14298 American Components, Inc.
Conshohocken, Pennsylvania

14655 Cornell-Dubilier Electronics
Newark, New Jersey

14674 Corning Glass Works
Corning, New York

14752 Electro Cube Inc.
San Gabriel, California

14869 Replaced by 96853

15636 Elec-Trol Inc.
Northridge, California

15801 Fenwal Electronics Inc.
Framingham, Massachusetts

15818 Amelco Semiconductor
Div. of Teledyne Inc.
Mountain View, California

15849 Useco, Inc.
Mt. Vernon, New York

15909 Replaced by 17870

16332 Replaced by 28478

16473 Cambridge Scientific Ind. Inc.
Cambridge, Maryland

16742 Paramount Plastics
Downey, California

16758 Delco Radio
Div. of General Motors
Kokomo, Indiana

17069 Circuit Structures Lab.
Upland, California

17856 Siliconix, Inc.
Sunnyvale, California

17870 Daven-Div. of Thomas A. Edison
Ind.--McGraw-Edison Co.
Manchester, New Hampshire

18083 Deleted

18178 Vactec Inc.
Maryland Heights, Missouri

18736 Voltronics Corp.
Hanover, New Jersey

19429 Montronics, Inc.
Seattle, Washington

19451 Perine Machinery & Supply Co.
Seattle, Washington

19701 Electra Mfg. Co.
Independence, Kansas

20584 Enochs Mfg. Co.
Indianapolis, Indiana

22767 ITT Semiconductors
Div. of ITT
Palo Alto, California

23732 Tracor
Rockville, Maryland

24248 Southco
Div. of South Chester Corp.
Lester, Pennsylvania

24655 General Radio Co.
West Concord, Massachusetts

25403 Amperex Electronic Corp
Semiconductor & Receiving
Tube Division
Slatersville, Rhode Island

28478 Deltrol Controls Corp.
Milwaukee, Wisconsin

28520 Heyman Mfg. Co.
Kenilworth, New Jersey

30323 Illinois Tool Works Inc.
Chicago, Illinois

33173 General Electric Co.
Tube Dept.
Owensboro, Kentucky

37942 Mallory, P. R., & Co., Inc.
Indianapolis, Indiana

38315 Honeywell Inc.
Precision Meter Div.
Manchester, New Hampshire

42498 National Company
Melrose, Massachusetts

43543 Nytronics Inc.
Transformer Co. Div.
Alpha, New Jersey

44655 Ohmite Mfg. Co.
Skokie, Illinois

49671 Radio Corp. of America
New York, New York

49956 Raytheon Company
Lexington, Maine

53021 Sangamo Electric Co.
Springfield, Illinois

55026 Simpson Electric Company
Chicago, Illinois

56289 Sprague Electric Co.
North Adams, Massachusetts

58474 Superior Electric Co.
Bristol, Connecticut

60399 Torrington Mfg. Co.
Torrington, Connecticut

62460 Deleted

63743 Ward Leonard Electric Co.
Mount Vernon, New York

64834 West Mfg. Co.
San Francisco, California

65092 Weston Instruments Inc.
Newark, New Jersey

66150 Winslow Tele-Tronics Inc.
Asbury Park, New Jersey

70563 Amperite Company
Union City, New Jersey

70903 Belden Mfg. Co.
Chicago, Illinois

71002 Birnbach Radio Co., Inc.
New York, New York

71400 Bussmann Mfg.
Div. of McGraw-Edison Co.
St. Louis, Missouri

71450 CTS Corp.
Elkhart, Indiana

71468 ITT Cannon Electric Inc.
Los Angeles, California

71482 Clare, C P. & Co.
Chicago, Illinois

71590 Centralab
Div. of Globe Union Inc.
Milwaukee, Wisconsin

71707 Coto Coil Co., Inc.
Providence, Rhode Island

71744 Chicago Miniature Lamp Works
Chicago, Illinois

71785 Cinch Mfg. Co. & Howard
B. Jones Div.
Chicago, Illinois

72005 Driver, Wilber B., Co.
Newark, New Jersey

72092 Replaced by 06980

72136 Electro Motive Mfg. Co.
Willimantic, Connecticut

72259 Nytronics Inc.
Berkeley Heights, New Jersey

72354 Deleted

72619 Dialight Corp
Brooklyn, New York

72653 G. C. Electronics
Rockford, Illinois

72665 Replaced by 90303

72794 Dzus Fastener Co., Inc.
West Islip, New York

72928 Gudeman Co.
Chicago, Illinois

72982 Erie Tech. Products Inc.
Erie, Pennsylvania

73138 Beckman Instruments Inc.
Helipot Division
Fullerton, California

73293 Hughes Aircraft Co.
Electron Dynamics Div.
Newport Beach, California

73445 Amperex Electronic Corp.
Hicksville, New York

73559 Carling Electric Inc.
Hartford, Connecticut

73586 Circle F Industries
Trenton, New Jersey

73734 Federal Screw Products, Inc.
Chicago, Illinois

73743 Fischer Special Mfg. Co.
Cincinnati, Ohio

73899 JFD Electronics Co.
Brooklyn, New York

73949 Guardian Electric Mfg. Co.
Chicago, Illinois

74199 Quam Nichols Co.
Chicago, Illinois

74217 Radio Switch Corp.
Marlboro, New Jersey

74276 Signalite Inc.
Neptune, New Jersey

74306 Piezo Crystal Co.
Carlisle, Pennsylvania

74542 Hoyt Elect. Instr. Works
Penacook, New Hampshire

74970 Johnson, E. F., Co.
Waseca, Minnesota

75042 IRC Inc.
Philadelphia, Pennsylvania

75376 Kurz-Kasch, Inc.
Dayton, Ohio

75382 Kulka Electric Corp.
Mt. Vernon, New York

75915 Littlelуse Inc.
Des Plaines, Illinois

76854 Oak Mfg. Co.
Crystal Lake, Illinois

77342 Potter & Brumfield
Div. of Amer. Machine & Foundry
Princeton, Indiana

77969 Rubbercraft Corp. of Calif. LTD.
Torrance, California

78189 Shakeproof
Div. of Illinois Tool Works
Elgin, Illinois

78277 Sigma Instruments, Inc.
South Braintree, Massachusetts

78488 Stackpole Carbon Co.
St. Marys, Pennsylvania

78553 Tinnerman Products
Cleveland, Ohio

79136 Waldes Kohinoor Inc.
Long Island City, New York

79497 Western Rubber Company
Goshen, Indiana

79963 Zierick Mfg. Corp.
New Rochelle, New York

80031 Mepco
Div. of Sessions Clock Co.
Morristown, New Jersey

80145 API Instruments Co.
Chesterland, Ohio

80183 Sprague Products
North Adams, Massachusetts

80294 Bourns Inc.
Riverside, California

80583 Hammarlund Co., Inc.
Mars Hill, North Carolina

80640 Stevens, Arnold Inc.
Boston, Massachusetts

81073 Grayhill Inc.
La Grange, Illinois

81312 Winchester Electronics
Div. of Litton Industries
Oakville, Connecticut

81439 Therm-O-Disc Inc.
Mansfield, Ohio

81483 International Rectifier Corp.
El Segundo, California

81590 Korry Mfg. Co.
Seattle, Washington

82376 Deleted

82389 Switchcraft Inc.
Chicago, Illinois

82415 Price Electric Corp.
Frederick, Maryland

82872 Roanwell Corp.
New York, New York

82877 Rotron Mfg. Co., Inc.
Woodstock, New York

82879 ITT Wire & Cable Div.
Pawtucket, Rhode Island

83003 Varo Inc.
Garland, Texas

83298 Bendix Corp.
Electric Power Division
Eatontown, New Jersey

83330 Smith, Herman H., Inc.
Brooklyn, New York

83478 Rubbercraft Corp. of America
New Haven, Connecticut

83594 Burroughs Corp.
Electronic Components Div.
Plainfield, New Jersey

83740 Union Carbide Corp.
Consumer Products Div.
New York, New York

84171 Arco Electronics, Inc.
Great Neck, New York

84411 TRW
Ogallala, Nebraska

86577 Precision Metal Products
Stoneham, Massachusetts

86684 Radio Corp. of America
Electronic Components & Devices
Harrison, New Jersey

86689 Deleted

87034 Marco-Oak Inc.
Anaheim, California

88419 Use 14655

88690 Replaced by 04217

89536 Fluke, John Mfg. Co., Inc.
Seattle, Washington

89730 Replaced by 08806

90201 Mallory Capacitor Co.
Indianapolis, Indiana

90215 Best Stamp & Mfg. Co.
Kansas City, Missouri

90211 Square D Co.
Chicago, Illinois

90303 Mallory Battery Co.
Tarrytown, New York

91293 Johanson Mfg. Co.
Boonton, New Jersey

91407 Replaced by 58474

91637 Dale Electronics Inc.
Columbus, Nebraska

91662 Elco Corp.
Willow Grove, Pennsylvania

91737 Gremar Mfg. Co., Inc.
Wakefield, Massachusetts

91802 Industrial Devices, Inc.
Edgewater, New Jersey

91836 King's Electronics
Tuckahoe, New York

91929 Honeywell Inc.
Micro Switch Div.
Freeport, Illinois

91934 Miller Electric Co., Inc.
Pawtucket, Rhode Island

93332 Sylvania Electric Products
Semiconductor Products Div.
Woburn, Massachusetts

94145 Replaced by 49956

94154 Tung-Sol
Div. of Wagner Electric Corp.
Newark, New Jersey

95146 Alco Electronics Products Inc.
Lawrence, Massachusetts

95263 Leecraft Mfg. Co.
Long Island City, New York

95264 Replaced by 98278

95275 Vitramon Inc.
Bridgeport, Connecticut

95303 Radio Corp. of America
Solid State & Receiving Tube Div.
Cincinnati, Ohio

95354 Methode Mfg. Corp.
Rolling Meadows, Illinois

95712 Dage Electric Co., Inc.
Franklin, Indiana

95987 Weckesser Co., Inc.
Chicago, Illinois

96733 San Fernando Electric Mfg. Co.
San Fernando, California

96853 Rustrak Instrument Co.
Manchester, New Hampshire

96881 Thomson Industries, Inc.
Manhasset, New York

97540 Master Mobile Mounts
Div. of Whitehall Electronics Corp.
Los Angeles, California

97913 Industrial Electronic Hdware Corp.
New York, New York

97945 White, S. S. Co.
Plastics Div.
New York, New York

97966 Replaced by 11358

98094 Replaced by 49956

98278 Microdot Inc.
Pasadena, California

98291 Sealectro Corp.
Conhex Div
Mamaroneck, New York

98388 Accurate Rubber & Plastics
Culver City, California

98743 Replaced by 12749

98925 Deleted

99120 Plastic Capacitors, Inc.
Chicago, Illinois

99217 Southern Electronics Corp.
Burbank, California

99515 Marshall Industries
Capacitor Div.
Monrovia, California

Revised August 1, 1968
Using H4-1 and H4-2
Dated June , 1968

WARRANTY

The JOHN FLUKE MFG. CO., INC. warrants each instrument manufactured by them to be free from defects in material and workmanship. Their obligation under this Warranty is limited to servicing or adjusting an instrument returned to the factory for that purpose, and to making good at the factory any part or parts thereof; except tubes, fuses, choppers and batteries, which shall, within one year after making delivery to the original purchaser, be returned by the original purchaser with transportation charges prepaid, and which upon their examination shall disclose to their satisfaction to have been thus defective. If the fault has been caused by misuse or abnormal conditions of operation, repairs will be billed at a nominal cost. In this case, an estimate will be submitted before work is started, if requested.

If any fault develops, the following steps should be taken.

1. Notify the John Fluke Mfg. Co., Inc., giving full details of the difficulty, and include the Model number, type number, and serial number. On receipt of this information, service data or shipping instructions will be forwarded to you.

2. On receipt of the shipping instructions, forward the instrument prepaid, and repairs will be made at the factory. If requested, an estimate of the charges will be made before the work begins, provided the instrument is not covered by the Warranty.

SHIPPING

All shipments of John Fluke Mfg. Co., Inc. instruments should be made via Railway Express prepaid. The instrument should be shipped in the original packing carton; or if it is not available, use any suitable container that is rigid. If a substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material.

CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be thoroughly inspected immediately upon receipt. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the instrument fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to John Fluke Mfg. Co., Inc. Upon receipt of this report you will be advised of the disposition of the equipment for repair or replacement. Include the model number, type number, and serial number when referring to this instrument for any reason.

The John Fluke Mfg. Co., Inc. will be happy to answer all application questions which will enhance your use of this instrument. Please address your requests to:

JOHN FLUKE MFG. CO., INC., P. O. BOX 7428, SEATTLE 33, WASHINGTON

Sales and Service Representatives

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HUNTSVILLE
BCS Associates, Inc.
2317 Bob Wallace Ave. S.W.
Tel. (205) 534-1648

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SEATTLE
Instrument Specialists, Inc.
5950 Sixth Ave. South
Suite 106
Seattle, Washington
Tel. (206) 767-4260

ARIZONA

PHOENIX
Barnhill Associates
4900 E. Indian School Road
Tel. (602) 959-2115

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2870 Los Feliz Place
Tel. (213) 665-5181

SAN FRANCISCO
Instrument Specialists, Inc.
2359 De La Cruz
Santa Clara, California
Tel. (408) 244-1505

COLORADO

DENVER
Barnhill Associates
1170 S. Sheridan Blvd.
Tel (303) 934-5505

CONNECTICUT

HARTFORD
Instrument Representatives, Inc.
P.O. Box 165
Glastonbury, Connecticut
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ORLANDO
BCS Associates, Inc.
940 N. Fern Creek Ave.
Tel. (305) 425-2764

HAWAII

HONOLULU
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646 Queen Street
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Cozzens & Cudahy, Inc.
9501 W. Devon Ave.
Rosemont, Illinois
Tel. (312) 825-1144

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INDIANAPOLIS
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44 Kirk Drive
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Metairie, Louisiana
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Electronic Marketing Assoc.
11501 Huff Court
Kensington, Maryland
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MASSACHUSETTS

BOSTON
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1046 Massachusetts Avenue
Arlington, Massachusetts
Tel. (617) 646-1034

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Technitron, Inc.
13657 Grand River Ave.
Tel. (313) 838-7324

MINNESOTA

MINNEAPOLIS
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7710 Computer Ave.
Tel. (612) 920-1022

MISSOURI

ST. LOUIS
Cozzens & Cudahy, Inc.
10534 Natural Bridge Road
Edmundson, Missouri
Tel. (314) 423-1234

NEW JERSEY

NEWARK
SBM Associates, Inc.
1519 Stuyvesant Avenue
Union, New Jersey
Tel. (201) 687-8737

NEW MEXICO

ALBUQUERQUE
Barnhill Associates
827 Pennsylvania Ave.
Tel. (505) 265-7766

NEW YORK

NEW YORK
SBM Associates, Inc.
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Pleasantville, New York
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LONG ISLAND
SBM Associates, Inc.
528 Old Country Road
Plainview, Long Island
Tel. (516) 433-1421

ROCHESTER
SBM Associates, Inc.
800 Linden Avenue
Tel. (716) 381-8330

SYRACUSE
SBM Associates, Inc.
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5858 E. Molloy Road
Tel. (315) 454-9377

NORTH CAROLINA

GREENSBORO
BCS Associates, Inc.
1039 E. Wendover Avenue
Tel. (919) 273-1918

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Technitron, Inc.
23203 Lorain Road
North Olmsted, Ohio
Tel. (216) 734-0960

DAYTON
Technitron, Inc.
1250 W. Dorothy Lane
Tel. (513) 298-9964

OREGON

PORTLAND
Instrument Specialists, Inc.
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Suite 106
Seattle, Washington
Tel. (206) 767-4260

PENNSYLVANIA

PHILADELPHIA
Acromatix Associates, Inc.
3118 Germantown Pike
Fairview Village, Pennsylvania
Tel. (215) 279-0377

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Technitron, Inc.
114 Spring Grove Road
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TEXAS

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Barnhill Associates
507B Bishop Street
Richardson, Texas
Tel. (214) AD 1-2573

HOUSTON
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Suite 203
3810 Westheimer
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11501 Huff Court
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5901 East Broadway
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Tel. (604) 291-7161

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376 Churchill Avenue — Suite 106
Tel. (613) 725-1288

TORONTO
Allan Crawford Associates, Ltd.
65 Martin Ross Avenue
Downsview, Ontario
Tel. (416) 636-4910

QUEBEC

MONTREAL
Allan Crawford Associates, Ltd.
6999 Cote de Neiges Road
Tel. (514) 739-6776

International Representatives

AUSTRALIA
Elmesco Instruments
41 Carter Road
Brookvale, N.S.W., Australia

AUSTRIA
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Techn. Beratung
Mollardgasse 54
Vienna VI, Austria

BELGIUM
C. N. Rood S/A
30 Rue Leon Frederic
Brussels 4, Belgium

DENMARK
Tage Olsen A/S
Ronnegade 1-0
Copenhagen, Denmark

FINLAND
Oy Findip AB Ltd.
Mannerheimintie 29C
Helsinki 25, Finland

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48 Avenue Victor Hugo
Clamart (Seine) France

HONG KONG and MACAO
Intronics Ltd.
4 Hankow Road, Suite 4A
Kowloon, Hong Kong

ISRAEL
R. D. T. Electronics
Engineering Ltd.
P.O. Box 21082
13 Dov-Hos Street
Tel-Aviv, Israel

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20146 Milano, Italy

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Central P.O. Box 999
Tokyo, Japan

Toyo Trading Co., Ltd.
4-37, Minamihonmachi
Higashika, Osaka, Japan

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Room 516, Bando Building
Seoul, Korea

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Rijswijk (Z. H.) The Netherlands

Fluke Nederland N. V.
Post Office Box 5053
Tilburg, The Netherlands

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Onehunga
Auckland, New Zealand

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Wesselsgt. 6
Oslo, Norway

OKINAWA
RYUKYU ISLANDS
Baxter Trading Co.
P.O. Box 26
Koza, Okinawa
Ryukyu Islands

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2246 Pasong Tamo
Makati, Rizal
Manila, Philippines

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Johannesburg, So. Africa

A. C. Gowlett (Pty.) Ltd.
P.O. Box 3641
Cape Town, So. Africa

A. C. Gowlett (Pty.) Ltd.
P.O. Box 2143
Durban, Natal, So. Africa

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P.O. Box H-3
Saigon, Vietnam

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Madrid, Spain

SWEDEN
Robert E. O. Olsson
Box 165
Tradgardsgatan 7
Motala, Sweden

SWITZERLAND
Omni Ray AG
Dufourstrasse 56
8008 Zurich, Switzerland

TAIWAN
Heighten Scientific Co., Ltd.
P.O. 1408
Taipei, Taiwan

THAILAND
G. Simon Radio Ltd.
30 Patpong Avenue
Suriwong
Bangkok, Thailand

THE UNITED KINGDOM
Fluke International Corp.
P.O. Box 102
Watford-Herts, England

WEST GERMANY
Rohde & Schwarz Vertriebs - Gmbh
5000 Koeln
Hohe Strasse 160-168
West Germany

Rohde & Schwarz Handels - Gmbh
1000 Berlin 10
Ernst - Reuter - Platz 10
West Germany

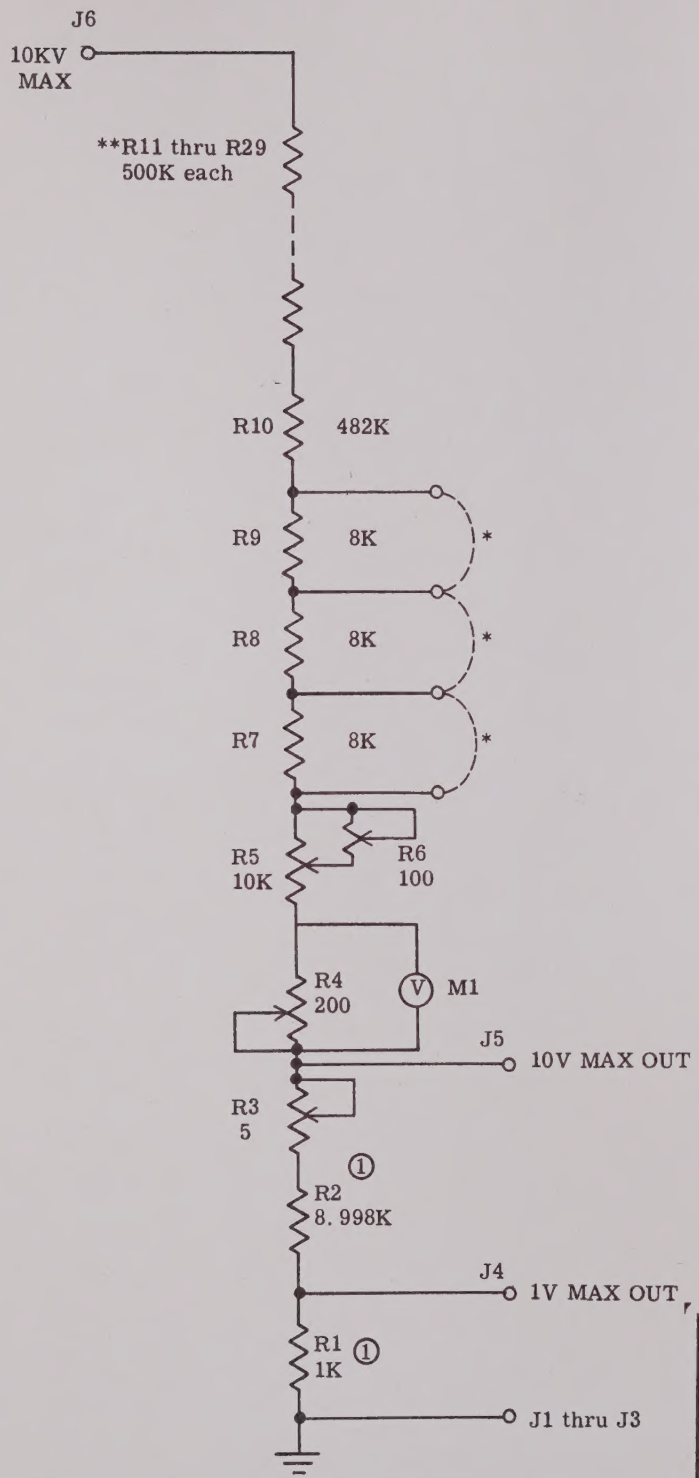
Rohde & Schwarz Vertriebs - Gmbh
2000 Hamburg 50
Grosse Bergstrasse 213-217
West Germany

Rohde & Schwarz Vertriebs - Gmbh
7500 Karlsruhe
Kriegsstrasse 39
West Germany

Rohde & Schwarz Vertriebs - Gmbh
8000 Muenchen
Dachauer Strasse 109
West Germany

In Europe contact FLUKE NEDERLAND, N. V., Post Office Box 5053, Tilburg, The Netherlands

FLUKE



*Calibration jumper

**Note: R20 thru R29 not used on 80E-5

① For Model 80E-5 & 80E-10 serial number 460 and on R1 & R2 changed to matched set

All resistors are in ohms and all capacitors are in microfarads unless otherwise noted.

FUNCTIONAL SCHEMATIC

MODEL 80E-5
MODEL 80E-10

VOLTAGE DIVIDER

MODEL 80E-5	SER. NO. 123 & ON
MODEL 80E-10	SER. NO. 123 & ON

FLUKE JOHN FLUKE MFG. CO., INC.
P.O. Box 7428 Seattle, Washington 98133